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Export activity, persistence and mark-ups*

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Abstract

This paper addresses the differences in margins across exporting and non-exporting firms. We jointly estimate a translog cost function, a variable factor share equation and price-cost margin equations to analyze the effect of persistence in export activity on margins. Results indicate that non-exporters have smaller margins than persistent exporters and firms that entered foreign markets during the nineties. However, larger export ratio is negatively associated with margins for persistent exporters. It suggests that efficiency advantages for exporters are partially compensated by higher competitive pressure in international markets. These results are in accordance with the predictions of Melitz and Ottaviano (2005).

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1. Introduction

A large bulk of work has recently analyzed the effect of export activity on firm productivity. That research supports a clear conclusion: exporters enjoy efficiency advantages over non-exporters. This literature found a strong theoretical support in Melitz (2003) paper, which stimulated an increasing literature about the characteristics of international activity in the presence of firm heterogeneity. Given this evidence, a further step would be to ask whether such productivity differences are passed through to profit advantages. However, much less effort has been devoted to analyze the impact of export activity on margins. Some recent papers have considered factors that can explain differences in mark-ups across firms related to export activity. In particular, Melitz and Ottaviano (2005) analyze selection and pro-competition effects of trade on mark-ups.

Several studies have introduced foreign trade as an explanatory variable of margins. In the case of imports, results suggest a negative effect on total profitability of domestic firms, though collusive behavior between domestic and foreign firms could reduce this effect[1]. Recent evidence also suggests that outsourcing strategies, since they stimulate an increase in trade of intermediate goods, may counteract the effect of imports as suggested by the market discipline hypothesis (Egger and Egger, 2004). With respect to export activity several papers have used aggregate data, where average margins across industries - approached through an accounting measure - are explained, among other variables, by an indicator of export behavior. Though there are several reasons to believe that exports could affect margins, results are far from being conclusive. In particular, Caves, Porter and Spence (1980), Geroski (1982) and Stalhammar

[1] Tybout (2001) surveys the theoretical link between imports and domestic mark-ups and summarizes the empirical

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(1991) obtain a negative, positive and a non-significant effect of the export ratio on industry profitability, respectively.

An alternative empirical approach is used by Bernstein and Mohnen (1991). Instead of analyzing the determinants of industry profitability, they estimate price-cost margin for domestic and export markets from a structural econometric model. Studying several Canadian industries, they find that the degree of oligopoly power differs between domestic and foreign markets. Following the same methodology, Bughin (1996) analyzes this question for a panel of Belgian firms. He obtains that monopoly power in export markets is smaller than in domestic markets. We find similar results for a subsample of persistent Spanish exporters (Moreno and Rodriguez (2004)). The objective of those papers was to analyze whether market power for export firms was different between domestic and foreign markets. However, there is scarce empirical evidence about the differences in margins associated to export activity using firm data. Görg and Warzynski (2003) have investigated this issue for UK firms. They use the technique proposed by Roeger (1995) based on the difference between the primal Solow residual (with a production function) and its price dual (based on a cost function). They find that UK exporters have higher mark-ups than non-exporters for differentiated goods, while non-significant differences are found for the case of homogeneous goods for both types of firms. Following a non-parametric approach, Girma, Görg and Strobl (2004) compare the performance (sales/employees and profits/employees) of domestic, exporters and multinational Irish firms. They do not find significant differences between domestic and exporters whereas distributions for multinationals dominate both kinds of firms.

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evidence at firm-level.

The objective of this paper is to analyze whether there are differences in margins for different groups of firms according to their export activity. We follow the methodology proposed by Bernstein and Mohnen (1991), based on a structural specification which comprises a translog cost function, a variable factor share equation and a price-cost margin equation. Firm margins are parameterised taking into account the degree of persistence of export activity. Specifically, we distinguish among non-exporters, entrants, exiters, switchers (firms that enter or exit more than once throughout the period) and persistent exporters.

This theoretical benchmark is applied to a panel of Spanish manufacturing firms for the period 1990-99. The evolution of the economic cycle and strong changes in the exchange rate system throughout that period should have affected the competitive position of exporters *vs* non exporters. The dataset allows us to analyze not only the differences in margins related to export and domestic activities, but also to know how market evolution affected both margins. The rest of the paper is as follows. Section 2 provides some insights about potential effects of export activity on margins. Section 3 explains the theoretical benchmark, both in a unimarket and multimarket context. Section 4 describes the data source and provides a descriptive approach in order to infer the relationship between margin and export activity. Section 5 gives the results of the estimates and, finally, main conclusions are summarized in Section 6.

2. Export activity and mark-ups

Though since mid-nineties several papers highlighted the relationship between productivity and export activity, it was not until recent years that the literature has provided a strong theoretical support. In that sense, Melitz (2003) paper could be considered as a main

contribution. He develops a dynamic model to explain intra-industry reallocations across firms with heterogeneity in the context of an open economy. The existence of entry costs in export markets plays a crucial role to explain the connection between trade and productivity: only more productive firms can cover entry costs in foreign markets. In this model trade affects the distribution of firms through the domestic factor market. Specifically, exporters and entrants increase the demand for labour. As consequence, real wage goes up and the least productive firms have to exit. Finally, less efficient survival firms do not export because they can not cover export sunk costs and reduce both domestic market share and profits.

The empirical evidence obtains that exporting firms are more efficient than non-exporters. It mostly supports the *self-selection* hypothesis, that stresses the idea that export markets select the most efficient firms due to the presence of higher sunk costs related to entry in foreign markets. See for example, Aw et al (1997) for Taiwan, Roberts and Tybout (1997) for Columbia, Bernard and Jensen (1999) for the United States and Delgado *et al* (2002) for Spain[2]. A complementary explanation is based on the *learning* hypothesis, which suggests that export activity induces productivity improvements. The main empirical distinction between both arguments is that while productivity differentials are *ex-ante* to firm entry in the *selection* explanation, the learning hypothesis points out that firms which begin to export should increase their productivity with respect to other firms after entering export markets. In the last case, though some papers have found some support (e.g., Girma, Greenaway and Kneller (2004)), the empirical evidence is not conclusive.

Most papers have focused on the relationship between export and productivity, but there

[2] Wagner (2007) provides an extensive survey of microeconomic studies.

is very scarce research about margins. In Melitz (2003) the most productive firms export and have higher profits, but mark-ups are exogenous. It is due to he assumes monopolistic competition under CES preferences. This question has been issued by Melitz and Ottaviano (2005), who incorporate endogenous mark-ups considering a linear demand system with horizontal product differentiation developed by Ottaviano, Tabuchi and Thisse (2002). In their model there is an endogenous distribution of mark-ups across firms that respond to the toughness of market competition, measured by the number and the average productivity of competing firms. In the equilibrium at firm level, lower cost firms set lower prices and earn higher revenues and profits that firms with higher costs. However, they also set higher mark-ups given that they do not pass the entire cost differential to consumer prices. In the free entry equilibrium competition is tougher in larger markets, where more firms compete and average prices are lower. As in Melitz (2003), trade increases average productivity by forcing least productive firms to exit. Nevertheless, it operates now through a different channel: the increased product market competition[3]. Firms respond to this tougher competition by setting a lower mark-up that outweighs the selection effect according to which the most productive firms survive and set higher mark-ups.

Bernard *et al* (2003) also develop a model that also predicts endogeneous margins. They assume a Bertrand competition framework where mark-ups are variable and the differences in efficiency among firms can be observed throughout differences in productivity[4]. As in Melitz

[3] Factor market competition plays no role in Melitz and Ottaviano (2005) because the supply of labour to the differentiated good sector is perfectly elastic.

[4] Productivity (R) is the monetary translation of efficiency (Z), such as $R_i = P_i Z_i$, where P_i refers to output price. Additionally, output price is defined as $P_i = M_i \frac{w}{Z_i}$, where w is the cost of an input bundle (firms are input price takers) and M_i is the mark-up. With perfect competition $M_i = 1$ and $R_i = w$, reflecting that prices change inversely to efficiency changes. However, if M_i is not equal to 1, differences in productivity can be observed.

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and Ottaviano (2005), this model suggests that more efficient firms set a higher markup. However, the analytical results imply, as consequence of the functional forms chosen, some surprising predictions, as they recognize. Specifically, the distribution of mark-ups is the same in any destination and does not depend on the level of technology or geographic barriers.

To analyze the relationship between export activity and margins is also suitable to consider the different conditions of trade in world markets in relation to domestic markets. In a context of homogeneous products, it is expected that goods sold in foreign markets have closer substitutes than those sold in domestic markets. It supports the usual assumption that foreign demand elasticity is bigger than domestic ones, so that non-exporting firms would have larger price-cost margins than exporters. Additionally, competitive environment influences the capacity of firms to achieve collusive agreements. That capacity may be larger in domestic markets, where firms are more protected from international competition, than in foreign markets. In fact, this is the main argument used to justify the negative impact of import penetration on domestic margins. Note that if differentiated products are assumed, exporters could sell to specific fringe demands in foreign markets with price elasticity smaller than the domestic demand. In this context exporting firms are not price takers in international markets and enjoy market power abroad. Therefore, margins related to sales in foreign markets could be higher than in domestic markets.

Two final questions should be considered in order to develop an empirical analysis of the relationship between export activity and mark-ups. Firstly, export is not always a persistent activity for firms: entries and exits from foreign markets are usually found. Additionally, it is

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usual to observe firms with erratic behavior in export activity. For these switching firms sunk costs would not be relevant, and their behavior is probably more related to incidental orders than to an elaborated strategy of entering in foreign markets. These arguments suggest that it is advisable to carefully distinguish the groups of firms that are not persistent exporters/non-exporters.

Secondly, the comparison between exporting *vs* non-exporting firms does not take into account that usually exporters also sell in domestic markets. Margins across markets for each firm could differ due to dissimilarities in demand elasticity and in the competition intensity. Additionally, differences in marginal costs associated to variable (e.g., transport) or sunk costs (e.g., costs associated to sales networks) could explain that exporters set different margins across markets. However, cost externalities from sales in foreign markets to domestic ones (i.e., scale economies) should be considered. Efficiency advantages induced by export activity should benefit firms' cost structure as a whole, irrespective of the market destination.

In short, there are arguments supporting differences in mark-ups for exporters *vs* non-exporters. On the one hand, those related to efficiency advantages suggest larger margins related to export activity. On the other hand, those related to the degree of market competition would imply smaller margins related to export activity. Consequently, in order to know what effect prevails an empirical analysis is required.

3. Econometric specification

We consider that firms sell a differentiated product in markets characterized by imperfect product competition, though we do not assume any specific market structure. The price-cost margin can be expressed, as usual, from[5]:

$$P(1-\mu) = C' \qquad (1)$$

where C' is marginal cost, P is product price and μ is the corresponding price-cost margin. If μ is expressed in terms of the demand elasticity and conjectural variations, the equation (1) can be interpreted as the first order condition of the profit maximization for a firm selling without capacity restrictions. Therefore $\mu = 0$ with perfect competition and price is equal to marginal cost, μ is equal to the inverse of demand elasticity if the firm faces monopolistic competition and, if firms operate in an oligopolistic context, μ reflects not only demand elasticity but also the strategic behavior of firms.

A suitable transformation for equation (1) is:

$$\frac{PY}{C}(1-\mu) = \frac{\partial \ln C}{\partial \ln Y} \qquad (2)$$

where Y is output (sales) and C is variable cost. From equation (2), the ratio of nominal sales to variable cost and output cost elasticities are required to estimate the margin. The advantage over equation (1) is that nominal and real sales are needed instead of price levels. The former are easier to be obtained because it only requires a price index. With respect to firm costs, we

[5] We omit the subscript about firms and time for simplicity.

assume a short-term context where capital stock is considered as a fixed factor. In this sense, the variable cost function is defined as follows:

$$C = C\left(P_f, Y, K, t\right) \tag{3}$$

where P_f is a vector of prices of variable factors (labor (X_L) and intermediate inputs (X_M)), K is capital stock and t is a time trend which represents the state of technology. We assume that variable factor prices are exogenous to firms. The cost function has the usual properties: it is increasing in variable factor prices and output, and it is also homogeneous of degree one in factor prices. Following Bernstein and Mohen (1991) and Bughin (1996) a translog cost function is specified. This function is especially interesting in this case because it is easily enlarged for the multiproduct (multimarket) context. The empirical specification of the translog cost function is:

$$\begin{aligned} \ln C^* = l\,\mathrm{n}\left(\frac{C}{P_M}\right) = \beta_0 + \beta_1 \ln Y + \beta_2 \ln w + \beta_3 \ln K + \beta_5 \ln Y \ln w + \beta_6 \ln Y \ln K \\ + \beta_7 \ln w \ln K + \frac{1}{2}\beta_8 \left(\ln Y\right)^2 + \frac{1}{2}\beta_9 \left(\ln w\right)^2 + \frac{1}{2}\beta_{10} \left(\ln K\right)^2 + \beta_{11} t + \varepsilon \end{aligned} \tag{4}$$

where w is the ratio P_L/P_M. In the previous specification, the restrictions corresponding to a degree one homogeneous cost function in variable input prices (P_L and P_M) have been imposed. Additionally, a time trend t has been added to measure technical progress[6].

Deriving from translog cost function, the equilibrium condition for the product market (equation (2)) can be rewritten as follows:

[6] We omit the parameter β_4 to facilitate comparisons with the multiproduct specification forward.

$$\frac{PY}{C}(1-\mu) = \beta_1 + \beta_5 \ln w + \beta_6 \ln K + \beta_8 \ln Y + \xi \qquad (5)$$

where (PY/C) is the ratio of revenue to variable cost. The margin of firm i in period t is parameterised to take into account the heterogeneity of firms across different industries and the impact of the business cycle according to the following equation:

$$\mu_{it} = \mu_s + \gamma D_{it}$$

where μ_s are industry dummies, related to demand elasticity, and D_{it} is a firm indicator of the business cycle for each firm. Though the business-cycle is usually approached with macroeconomic indicators, the variable included in our parameterization is an individual variable calculated from the information given by firms. Specifically, the firms give annual information about market served (up to five) identifying the proportion of sales in each market. They also identify the behavior of market demand during one year with respect to the previous year according to three different categories: recession, stability and expansion. A value of 1, 2 and 3 is assigned to each category, respectively. We calculate an index for all markets served by the firm, weighting the values 1, 2 and 3 by the proportion of sales in each market. This variable, which is continuous between 1 and 3, allows us to measure more accurately the evolution of business-cycle in relevant markets for each firm.

To analyze how export activity affects mark-ups we have also included a set of dummy variables in the parameterization of margin (equation (5)), namely *ED*. It considers if the firm has always exported throughout the period (*persistent*), whether it has never exported (*non-exporter*), whether it has entered or exited in some year in the period (*entrant* and *exiter*, respectively) and, finally, wheher the firm has entered and exited more than once throughout the period (*switcher*). Alternatively, for exporting firms we have also included export ratio, defined as exports over total sales. Therefore, the econometric specification is:

$$\frac{PY}{C}[1-(\mu_s+\gamma D_{it}+\delta ED_{it})]=\beta_1+\beta_5\ln w+\beta_6\ln K+\beta_8\ln Y+\xi \qquad (5b)$$

Besides, though labor cost share is not necessary to identify the parameters, it is included in the set of equations for the sake of efficiency. Shephard´s lemma can be used to derive the equilibrium conditions for input demand: $S_f=\frac{\partial \ln C}{\partial \ln P_f}$, where $S_f=\frac{P_f X_f}{C}$ is the variable cost share of input. Labor cost share is then estimated as[7]:

$$\frac{P_L X_L}{C}=\beta_2+\beta_5\ln Y+\beta_7\ln K+\beta_9\ln w+\tau \qquad (6)$$

The equations system to be estimated is comprised of (4), (5b) and (6). As usual, using the estimated parameters, the share of labor costs and the intermediate inputs costs allow us to obtain some additional results such as scale economies, substitution elasticity and the own-price elasticity of input demand.

To take into account the multimarket character of exporters we have extended the uniproduct framework to a multiproduct specification. This is the approach used by Bernstein and Mohnen (1991) and Bughin (1996) to estimate price-cost margin differentiating between export and domestic markets. Assuming that exporters sell simultaneously in domestic (*d*) and foreign (*x*) markets, the corresponding set of equations to be jointly estimated is now:

[7] Since the sum of the two variable inputs shares equals unity, the intermediate inputs share can be treated as a residual.

$$\ln C^* = \ln\left(\frac{C}{P_M}\right) = \beta_0 + \sum_j \beta_{1j} \ln Y_j + \beta_2 \ln w + \beta_3 \ln K + \beta_4 \ln Y_d \ln Y_x$$
$$+ \sum_j \beta_{5j} \ln Y_j \ln w + \sum_j \beta_{6j} \ln Y_j \ln K + \beta_7 \ln w \ln K + \frac{1}{2}\sum_j \beta_{8j} \left(\ln Y_j\right)^2 \quad (7)$$
$$+ \frac{1}{2}\beta_9 \left(\ln w\right)^2 + \frac{1}{2}\beta_{10} \left(\ln K\right)^2 + \beta_{11} t + \varepsilon$$

$$\frac{P_j Y_j}{C}(1-\mu_j) = \beta_{1j} + \beta_4 \ln Y_{-j} + \beta_{5j} \ln w + \beta_{6j} \ln K + \beta_{8j} \ln Y_j + \xi_j \quad \text{j = d,x} \quad (8a,8b)$$

$$\frac{P_L X_L}{C} = \beta_2 + \sum_j \beta_{5j} \ln Y_j + \beta_7 \ln K + \beta_9 \ln w + \tau \quad (9)$$

which corresponds to a multiproduct translog cost function (7), margin equations for each market (8a and 8b) and labor cost share (9). The assumption to justify a multiproduct translog cost function is that variable costs include some costs that could differ among outputs Y_d and Y_x. It includes transport costs or advertising, among others. However sunk costs, such as those for establishing delivery channels in export markets, would not be considered in this short-term benchmark. This approach implies imperfect product substitution in the production function between output sold in domestic and foreign markets.

4. Data and descriptive analysis

The sample used consists of a balanced panel of Spanish manufacturing firms for the period 1990-1999. The variables were obtained from the *Encuesta Sobre Estrategias Empresariales* (ESEE, Survey on Business Strategies). This survey is carried out yearly by the Fundacion SEPI, with the support of Spanish Ministry of Industry. The sampling scheme is conducted for each manufacturing NACE class (two-digit) level. Companies with between 10 and 200 employees are chosen by a random sampling scheme and the rate of participation is

around 4%. For firms employing more than 200 employees, the rate of participation is about 60%. The sample considered is about 2000 manufacturing firms that have ten or more employees each year. We exclude firms not surveyed for every year throughout that period and those for which information is lacking. This was especially relevant for capital stock and price variations, required in order to obtain the price index of intermediate inputs and the price indices of domestic and foreign markets (see Appendix for variable definition). The number of available firms, after those with incomplete information were excluded, is 695 (6950 observations).

[Table 1]

As can be seen in Table 1, jointly with the two extreme situations (exporting/non-exporting), a significant number of firms change their behavior in the period. About 10% of firms enter in foreign markets (*entrants)*, while almost 17% of firms enter or exit more than once throughout the period (*switchers*). It suggests that exporting is a mere occasional activity for about one fifth of firms. On the contrary, it is very strange to observe firms exiting from foreign markets (*exiters*): it only happens in about 2% of the cases[8]. Additionally, average export ratio (defined as exports over total sales) is clearly related to export persistence. It is about 35% for exporters, and it is less than 10% for firms that do not have a persistent activity in foreign markets. As is usual when export activity is analyzed, size is positively related to export activity: about forty percent of small-medium firms (less than 200 employees) exported during this period. For larger firms (more than 200 employees) this percentage surpasses 80%.

[Table 2]

[8] This result could be biased due to the classical attrition problem in balanced panels.

With the aim of obtaining a preliminary picture about differences in margins among firms, we use a simple approach based on the correlation between an accounting indicator of firm profits (Operating surplus over sales, OS) and export activity. The latter is measured with a set of dummy variables that capture the degree of persistence in export activity according to previously defined categories. The first two columns of Table 2 show the results of five regressions where the dependent variable is the operating surplus and the explanatory variables are a constant and the corresponding dummy. As can be seen, persistent exporters show larger average surplus than the rest of firms, while the opposite result emerges for switchers and non-exporters. Entrants (exiters) have margins above (below) average, though the differences are non-significant in both cases.

These results could hide a composition bias: if the probability of being an exporter is larger in industries with larger margins, then the previous comparison of average values is reflecting inter-industry differences. To control it, the third and fourth columns of Table 2 show five alternative estimations where the dependent variable is the deviation of operating surplus with respect to the industry average. Industries are defined at two-digit level of the European industrial classification (NACE) and it comprises twenty manufacturing activities. As can be seen, there are not significant differences with respect to former estimates and, consequently, the positive correlation between export activity and operating surplus seems to be robust to inter-industry differences. This result is similar to those obtained by Bernard *et al* (2003) about productivity advantages for exporters.

These descriptive results suggest that efficiency advantages for exporters prevail over international competition effects. However, as was previously suggested, an interesting question

is whether such efficiency effects imply that exporters have higher operating surplus irrespective of the geographical market or, by the opposite, margins differ among them. The sixth row in Table 2 shows the results for the subsample of persistent exporters, where a constant and the export ratio have been included as explanatory variables. In this case a negative relationship between the intensity of export activity and surplus arise, even when inter-industry differences are controlled. This result could suggest that foreign margin is lower than domestic margin for persistent exporter. The analysis in the next section assesses this question more carefully.

5. Econometric results

In this section the theoretical benchmark explained in Section 3 is applied. We begin by considering all firms, evaluating whether margins differ among different groups according to the degree of persistence in export activity: non-exporters, entrants, exiters, switchers and exporters. It implies to impose the same structure of costs for the entire sample. However, dummy variables are introduced in the translog cost (equation (4)) and margin equation (equation (5b)) to control for differences in technical conditions across industries. Descriptive statistics for all variables and sub-samples are showed in Table A.1 of the Appendix.

Table 3 shows the joint estimate of the translog cost function, the cost labor share and the margin equation by the Generalised Method of Moments (GMM)[9]. We assume that firms

[9] The estimations is carried by TSP program. Note that the margin equation is non-linear. This fact is considered in the joint estimation.

are price-takers in variable input markets, so variable input prices are considered exogenous, while endogeneity in sales is assumed. The estimation is carried out by instrumenting the endogenous variables with their cross-section lagged values at t-2. The identification of the parameters depends on whether lagged values of the endogenous variables are valid instruments. The Sargan test of overidentifying restrictions, a test of instrument validity, is presented at the bottom of the columns and the validity of instruments is accepted. Two additional artificial dummies (Mov1 and Mov2) have been also included to control firms that have experienced mergers or scissions during the period. The time trend in the estimate of the cost function, whose associated parameter can be seen as technical progress, presents the expected negative sign and a reasonable value (-1.6)[10]. Industrial dummies are also jointly significant.

[Table 3]

With respect to margins, the first column in Table 3 shows the parameter μ_s, calculated as the average of a set of 14 industrial dummies. The F-test showed at the bottom of Table 3 confirms their significance. As we said above, a demand indicator is included to consider the business cycle. An increase in this variable means an improvement in market conditions. As can be seen, the parameter for firm indicator of demand evolution (D_{it}) presents the expected positive sign, which suggests a procyclical behavior of margins. This parameter, multiplied by the average value of demand evolution, and added to estimated parameter μ_s, allows us to obtain an average margin of 11.2% for all firms in the complete period.

[10] When estimations are run for each group, exporter and non-exporters present values around -2.5, while the .../...

In column 2, the margin is parameterised to take into account differences across firms according to export behavior. Because we omit the dummy referred to non-exporters, the coefficients for the other groups reflect the relative differences with respect to those firms that do not export. The results indicate that entrants and persistent exporters show larger margins than non-exporters. However, there are non significant differences between this last group and those firms which exit or enter and exit (switchers) in foreign markets.

Figure 1 presents the sample average of the margins during the nineties by sub-samples. In this case the values for demand evolution are specified for each group of firm and for each year. Deviation from perfect competition is observed in all groups of firms, a result in line with previous empirical research about firm margins (see Nishimura *et al* (1999)). In keeping with the estimated coefficient of the evolution of demand in Table 3, the margins are procyclical and show the smallest values in 1992-1993. This behavior is consistent with the cycle of the European economy, which experienced a short recession in those years[11].

[Figure 1]

The main result obtained is that persistent export activity seems to be associated with larger margins. Specifically, while non-exporters have an average margin of around 10.4%, it is about 12% for persistent exporters. This difference, significant at 99%, suggests that efficiency advantages of exporters are also reflected in relative margins. From the estimates of Table 3, and using equation (5b), it is possible to calculate the predicted margin for each firm. Figure 2 shows the distributions of the average margins for the period 1991-1999 for non-exporters,

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technical progress is smaller for exiters (-1.6) and switchers (-1.3).

[11] Though there are theoretical arguments for both signs, the empirical evidence supports a positive relationship between the economic cycle and the margins. See, for example, Lima and Resendez (2004).

entrants and exporters. All distributions are slightly skewed, with a large proportion of firms with margins between 0 and 0.2. Comparing across different groups, we observe that there is a bigger proportion of non-exporting firms with small margins. Entrants show the largest values, which is related to the existence of a small share of firms with margins bigger than thirty percent. These firms could be taking advantage of some product innovations which let them to access to specific fringe of foreign demand. If that would be the case it seems reasonable to expect that such margins would be reduced when they stay in export market for a longer period. However, though technological effort is higher for these firms than for non-exporters, we do not find significant differences between entrants and persistent exporters. We only observe that entrants firms with small and medium size (less than 200 employees) are younger than persistent exporters. Nevertheless, the average margin could be conditioned by extreme values, due to the small number of firms that enter in the export activity.

[Figure 2]

The estimate of the translog cost function also allows us to obtain predictions for output cost elasticities and the marginal cost for each firm. Using the sample average of the share of labor cost and intermediate inputs to total variable costs, it is possible to calculate the Allen-Uzawa partial elasticities of substitution, the own-price elasticities of demand and returns to scale economies. As expected, price elasticities are negative and the inputs (labor and intermediate materials) are substitutes. The scale elasticity value is equal to one suggesting that firms seem to operate under constant returns to scale[12].

[Table 4]

[12] These results are available upon request.

The above results suggest that export activity is positively related to margins. However, the comparison among groups is affected by the non persistent pattern of groups 2, 3 and 4, which would share characteristics both of exporters and non-exporters. For that reason a complementary estimate, restricted to groups 1 and 5, is shown in Table 4. The results again show clear differences between persistent non-exporters and persistent exporters. Is this a consequence of the kind of firms operating in both markets, or rather the effect of market characteristics? To answer this question we focus our attention on persistent exporters and those firms that start to export throughout the period. Because of the multimarket characteristics of both groups, the use of a multiproduct cost function can provide useful information. As was explained in Section 3, this approach allows us to estimate the margin in domestic and foreign markets.

Table 5 presents the estimates for the group of firms that are persistent exporters. These firms are multimarket by nature, given that all of them sell simultaneously in domestic and export markets. It allows us to answer whether observed differences in margins among exporters and non-exporters are due to efficiency advantages of the former or whether they are the consequence of differences in competitive pressure among foreign and domestic markets. In particular, the previous result about larger margins of exporters is not only coherent with efficiency advantages for exporting firms, but also with a smaller competitive pressure in foreign markets. To contrast this question we follow two different approaches. Firstly, in column 1 we estimate jointly the translog multiproduct cost function (equation (7)), the domestic and foreign margin equations (8a and 8b) and the cost labor share (equation (9)). It lets to obtain margins differentiated across markets. In this case, we also introduce two business cycle indicators, one for each market. Secondly, in column 2 we follow a unimarket

approach, without distinguishing between domestic and foreign markets, but where the margin is parameterised taking into account the intensity of export activity, measured as export ratio (ER).

[Table 5]

As can be seen in column 1, the average price-cost margin in foreign markets is smaller than margin in domestic destinations. This result is in line with those obtained by Bernstein and Mohnen (1991), Bughin (1996) and Moreno and Rodríguez (2004). Additionally, note that the estimated coefficient associated to $\ln Y_d \ln Y_x$ (parameter β_4) is negative and significant, reflecting cost complementarities between both outputs: variable cost due to one output declines as the other output grows[13].

The approach used in column 2 supports the previous result about the effect of export activity on margins for exporters. The coefficient of export ratio is negative: the bigger the export intensity, the smaller the margin of exporters. It points out that exporting firms affront larger competitive pressure in international markets. Given that we had obtained that exporters have larger margins that non-exporters, we can conclude that efficiency advantages dominate over competitive pressures for exporters.

With respect to entrants, though they are multimarket firms once they start to export, there is a problem with zero values before to entering in foreign markets. Several solutions have been provided when the objective is just to evaluate cost parameters. The most well-

[13] The estimation also allows us to obtain predictions for output cost elasticities and marginal costs in each market. The export elasticity was smaller than the domestic: 0.398 and 0.595, respectively. As we expected, the marginal costs for output sold in foreign markets are slightly larger than marginal costs associated to products sold in domestic markets.

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known is the Generalized Multiproduct Cost Function (GMCF) that uses a Box-Cox metric to transform zero values (Caves, Christensen and Tretheway (1980)). However, given that our objective is to consider cost function in a joint system to estimate margins, zero values for exports continues being a problem. Specifically, the left side of equation (8b) will be zero in those years that entrants do not export. Although we can use the proposed approach to estimate the cost equation, it is impossible to use it for the joint system.

Therefore, we just present an estimate where export ratio is included in the margin parameterisation. The results, showed in column 3 of Table 5, are coherent with those obtained for persistent exporters: export intensity affects negatively to margins. Note that we are treating homogeneously to all firms, with independence whether they enter at the beginning or at the end of the period. However, as was previously pointed out, the small number of available observations for this group makes difficult to capture the dynamic evolution of the effect of exporting behavior on margins.

This restriction on data avalaibilty also difficults specific industry analysis to contrast whether results obtained for persistent exporters can be generalized. Table 6 shows the results for two of them with enough observations. As usual, inter-industry heterogeneity is substantial. For the automobile industry, the larger the export ratio the larger is the average margin. This result can be related to product differentiation, which could justify a bigger margin whether firms make a profitable use of specific fringes of demand. Additionally, most firms in this industry are multinationals and, in this sense, it is likely that they have market power abroad. On the contrary, Textile industries show the same result that the manufacturing

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industry as a whole. This can indicate that firms in this activity behave as price-takers in international markets. Majority of these firms are domestic-located and have not productive plants in foreign countries.

[Table 6]

6. Conclusions

The empirical evidence strongly supports that exporters are more productive than non-exporters. It is in accordance with theoretical predictions, which have emphasized the idea that only more productive firms enter in export markets because they generate enough revenues to cover sunk costs associated to this activity. However, there is scarce evidence about the effects of export activity on firm margins. While most theoretical papers have assumed fixed markups, more recent research has considered them as endogeneous. In particular, Melitz and Ottaviano (2005) consider two potential effects in firm margins related to export activity. On the one hand, more productive firms use efficiency advantages to set larger margins. On the other hand, this selection effect is outweighted by the pro-competitive effect related to entry in international markets.

This paper analyzes this issue using a structural approach to identify price-cost margin among groups of firms. These are defined according to the degree of persistence in export activity. The results point out that exporting firms, both persistent exporters and entrants, set larger margins than non-exporters. It suggests that efficiency advantages found in previous empirical evidence are transmitted to mark-ups. The comparison of some relevant variables between exporters and non-exporters provides some clues about what exporters do with these

larger margins. Specifically, the relative average wages are 46.7% larger for exporters, which are also much more technological intensive than non-exporters. For example, while the share of staff employed in R&D activities (over total employment) is 2.55% for persistent exporters, it is only 0.51% for non-exporters. This result should be considered carefully because export and technological activities are surely simultaneous decisions for firms.

Additionally, when the analysis is confined to exporting firms, we obtain that margins in foreign markets are smaller than those related to domestic markets. It suggests that the pro-competitive effect is relevant: exporters affront larger competitive pressures in international markets. However, this negative effect related to the exposure to foreign markets does not dominate over the positive effect related to efficiency advantages. This result is in line with Görg and Warzynski (2003) who, using a different approach, found that UK exporters have higher mark-ups than non-exporters for differentiated goods.

Appendix: Variable definitions and descriptive statistics

OS (Operating surplus): Value of gross output minus variable costs of production divided by the value of total sales. The gross output value is computed as sales + stock variation + other revenues, and the variable costs of production as intermediate consumption (raw materials and services) + labor costs.

ER (Export ratio): Proportion of exports over total sales.

C (Variable costs): The sum of intermediate consumption (raw materials purchases, energy and fuel costs and other external services) plus labor costs minus the stock variation.

W (Cost per worker relative to price of intermediate inputs): P_L/P_M, where:

P_M *(Price index for intermediate inputs):* It is calculated as a Paasche index, weighting the price variations of raw materials, energy and services purchased of surveyed firms.

P_L *(Cost per worker):* Labor cost divided by the average workers of the firm during the year.

Y (Output sold): It is calculated by deflating nominal sales by price (P).

Y_x *(Output sold on the export market):* It is calculated by deflating nominal exports by export price (P_x).

Y_d *(Output sold on the domestic market):* It is calculated by deflating nominal domestic sales by domestic price (P_d). Domestic sales are the total sales of the firm minus its exports.

P, P_d *and* P_x *(Price index for output sold in all markets, in domestic and foreign markets):* The surveyed firms give annual information about markets served (up to five), identifying their relative importance (in percentage) in total sales of the firm. Additionally, each firm identifies the geographical area and the variation of price with respect to the previous year. This information allows us to calculate a price index for all markets and for each market, using the proportions with respect to total sales as weighting.

K (Capital stock): It is net stock of capital for equipment in real terms. It is calculated by using

the perpetual inventory formula:

$$K = (1-d)K_{t-1}(P_t / P_{t-1}) + I_t$$

where P is the price index for equipment, d are the rates of depreciation, and I is the investment in equipment.

D_{it}, D_{it}^{d}, D_{it}^{x} (Individual indicator of the business cycle in all markets, domestic and foreign markets): In the ESEE survey, each firm identifies the behavior of market demand during one year with respect to the previous years according to three different categories: recession, stability and expansion. A value of 1, 2 and 3 is assigned respectively to each category. The domestic and foreign indices are constructed by weighting the previous values over all domestic and foreign markets defined by each firm. The weights are the proportion of sales in each market with respect to total sales. Although the original variable takes values 1, 2 and 3 in each market (up to five) where the firm sells, the indices that we calculate for each firm takes are "continuous" between 1 and 3.

Table A.1

Variable descriptive firms (logarithmic variations rates, 1991-99)

	All firms	Non-exporters	Entrants	Exiters	Switchers	Exporters
Output (volume terms)	4.2	2.1	5.8	1.7	4.9	4.9
Output (nominal terms)	5.6	3.6	7.4	2.7	6.1	6.3
Cost per worker (P_L)	4.9	4.8	4.9	4.5	4.5	5.1
Price index for intermediate inputs	3.3	3.6	3.2	3.3	3.6	3.0
Stock of real capital	8.2	7.2	11.4	7.1	8.9	7.9
Variable cost	5.9	4.1	7.1	2.3	6.3	6.6

References

Aw, B.A., Chen, X. and M.J. Roberts (2001): "Firm-level Evidence on Productivity Differentials and Turnover in Taiwanase Manufacturing", *Journal of Development Economics,* 66, pp 51-86.

Bernard, A., Eaton, J. and J. Jensen (1999): "Exceptional exporter performance: cause, effect, or both?", *Journal of International Economics,* 473, pp. 1-25.

Bernard, A., Eaton, J., Jensen, J. and S. Kortum (2003): "Plants and Productivity in International Trade", *American Economic Review,* 93, pp. 1268-1290.

Bernstein, J. and P. Mohnen (1991): "Price-Cost Margins, Exports and Productivity growth: with an Application to Canadian Industries," *Canadian Journal of Economics,* 24, pp. 638-659.

Bughin, J. (1996): "Capacity Constraints and Export Performance: Theory and Evidence from Belgian Manufacturing," *Journal of Industrial Economics,* 44, pp. 187-204.

Caves, D.W., Christensen, L.R. and M.W. Tretheway (1980): "Flexible costs functions for multiproduct firms," *Review of Economic and Statistics*, 62, pp. 467-481.

Caves, R.E., Porter, M. and A.M. Spence (1980): *Competition in the Open Economy: A Model Applied to Canada,* Cambridge MA, Harvard University Press.

Delgado, M., Fariñas, J.C. and S. Ruano (2003): "Firm productivity and export markets: a nonparametric approach", *Journal of International Economics,* 57, pp. 397-422.

Egger, H. and P. Egger (2004): "On the Relationship Between International Outsourcing and Price-cost Margins in European Industries", *Review of Industrial Organization,* 25(1), 45-69.

Geroski, P. (1982): "Simultaneous equations models of the structure-performance paradigm," *European Economic Review,* 19, pp.145-158.

Girma, S., D. Greenaway and R. Kneller (2004): "Does exporting increase productivity? A Microeconometric Analysis of Matched Firms", *Review of International Economics,* 12 (5), pp. 855-866.

Girma, S., H. Görg and E. Strobl (2004): "Exports, international investment, and plant performance: evidence from a non-parametric test", *Economic Letters*, 83, pp. 317-324.

Görg, H. and F. Warzynski (2003): "Price Cost Margins and Exporting Behaviour: Evidence from firm level data", *Research Paper Levelhulme Centre* 2003/24.

Lima, M. and M. Resendez (2004): "Profit margins and business cycles in the Brazilian industry: a panel data study", *Applied Economics* 36, pp. 923–930.

Melitz, M.J. (2003): "The impact of trade on intra-industry reallocations and aggregate industry productivity", *Econometrica,* 71, 6, pp. 1695-1725.

Melitz, M. J. and G.I.P. Ottaviano (2005): "Market Size, Trade, and Productivity". NBER Working Paper Series, 11393 (forthcoming in *The Review of Economic Studies*).

Moreno, L. and D. Rodríguez (2004): "Domestic and Foreign Price-Marginal Cost Margins: An Application to Spanish Manufacturing Firms", *Review of International Economics,* 12 (1), pp. 60-80.

Nishimura, K., Ohkusa, Y. and K. Ariga (1999): "Estimating the mark-up over marginal cost: a

panel analysis of Japanese firms 1971-74," *International Journal of Industrial Organization,* 17, pp. 1077-1111.

Ottaviano, G.I.P., T. Tabuchi and J.-F. Thisse (2002): "Agglomeration and Trade Revisited", *International Economic Review* 43, pp. 409-436.

Roberts, M. and J. Tybout (1997): "The decision to export in Colombia: An Empirical Model of Entry with Sunk Costs", *American Economic Review,* 87 (4), pp. 545-564.

Roeger, W. (1995): "Can imperfect Competition Explain the Difference between Primal and Dual Productivity Measures? Estimates for U.S. Manufacturing", *Journal of Political Economy* 103, pp. 316-330.

Stalhammar, N. (1991):"Domestic market power and foreign trade: The case of Sweden," *International Journal of Industrial Organization,* 9, pp. 407-424.

Tybout, J. (2001): "Plant and firm-level evidence on "New" Trade Theories", NBER 8418.

Wagner, J. (2007): "Exports and Productivity: A Survey of the Evidence from Firm-level Data", *The World Economy* 30 (1), pp.60–82.

Table 1. Descriptive statistics across type of firms

	Non-exporters	Entrants	Exiters	Switchers	Exporters
Export ratio	0	4.5	2.2	5.7	34.6
Export ratio (only exports > 0)	0	8.1	5.2	12.1	34.6
(Observations with export > 0)	(0)	(388)	(73)	(540)	(3250)
Size (number of employees)	40.6	158.1	219.2	144.1	388.7
Total observations	1690	700	170	1140	3250

Table 2 - Operating Surplus over Sales (OS): OLS Estimations

	Dependent variable:			
	OS		**OS-OS$_s$**	
All firms, dummy included:	***Constant***	***Dummy***	***Constant***	***Dummy***
(1) Non-exporters	10.7 (41.7)	-1.10 (-2.3)	0.24 (1.1)	-0.99 (-2.2)
(2) Entrants	10.4 (42.2)	0.78 (1.2)	-0.07 (0.3)	0.73 (1.1)
(3) Exiters	10.5 (44.0)	-0.91 (-0.7)	0.02 (0.1)	-0.89 (-0.7)
(4) Switchers	10.8 (42.4)	-1.78 (-3.3)	0.28 (1.3)	-1.71 (-3.2)
(5) Exporters	9.6 (30.7)	1.66 (4.0)	-0.70 (-2.6)	1.49 (3.8)
Subsample of exporters:				
(6) Export ratio	11.8 (35.7)	-0.03 (-3.7)	1.69 (5.4)	-0.03 (-3.4)

Notes:

- The number of observations when all firms are considered (regressions (1) to (5)) is 6950. For the subsample of exporters the number of observations is 3250.
- t-ratios in parenthesis.
- OS_s is the average value of operating surplus for industry s.

Table 3. Cost Function, Cost Labor Share and Margin Equation (Joint Estimate by GMM).

	(1)		(2)	
	Coefficients	**t-statistics**	**Coefficients**	**t-statistics**
β_0	-0.378	-0.5	-0.453	-0.6
β_1	1.034	32.2	1.052	31.5
β_2	0.204	1.5	0.205	1.5
β_3	-0.024	-0.3	-0.030	-0.4
β_5	0.010	1.5	0.010	1.4
β_6	0.027	9.2	0.028	9.5
β_7	-0.012	-0.7	-0.011	-0.7
β_8	-0.014	-7.4	-0.015	-7.8
β_9	-0.001	-0.0	-0.001	-0.0
β_{10}	-0.014	-3.8	-0.014	-3.8
β_{11}	**-0.016**	**-2.1**	**-0.016**	**-2.1**
Mov1	-2.496	-1.5	-2.490	-1.5
Mov2	1.687	1.6	1.761	1.7
μ_s	**0.066**	**3.0**	**0.060**	**2.7**
Entrants			**0.030**	**3.8**
Exiters			**0.006**	**0.7**
Switchers			**0.007**	**1.1**
Exporters			**0.011**	**2.1**
D_{it}	**0.022**	**6.7**	**0.022**	**6.6**
Average Margin	**0.112**	**5.6**		
Non-exporters			**0.104**	**5.2**
Entrants			**0.136**	**6.5**
Exiters			**0.111**	**5.3**
Switchers			**0.112**	**5.3**
Exporters			**0.118**	**5.9**
Sargan test	14.9 (13)		13.7 (13)	
Industrial dummies F-test (cost)	78.6 (19,5541)		77.9 (19,5541)	
Industrial dummies F-test (margin)	83.5 (13,5547)		85.8 (13,5547)	
Number	5560		5560	
Years	1992-1999		1992-1999	

Notes:
- t-statistics are robust to heterocedasticity.
- Apart from the exogenous variables, the instruments used are the lagged values at *t-2* of the following variables: *y*, y^2 and time and industry dummies for the cost equation and *y*, y^2, *k*, *w* and time and industry dummies for the margin equation.
- In the Sargan test and industrial dummies F-test, freedom degrees are in parenthesis.

Table 4. Cost Function, Cost Labor Share and Margin Equation (Joint Estimate by GMM): Persistent exporters and non exporters

	(1)		(2)	
	Coefficients	**t-statistics**	**Coefficients**	**t-statistics**
β_0	-0.496	-0.5	-0.631	-0.6
β_1	1.034	28.1	1.061	26.7
β_2	0.398	2.8	0.390	2.7
β_3	0.027	0.2	0.024	0.2
β_5	0.007	0.9	0.008	1.0
β_6	0.030	9.6	0.030	9.7
β_7	-0.047	-2.9	-0.047	-2.9
β_8	-0.015	-7.4	-0.017	-7.7
β_9	0.101	2.8	0.103	2.8
β_{10}	-0.016	-3.0	-0.016	-2.9
β_{11}	**-0.020**	**-3.6**	**-0.021**	**-3.6**
Mov1	-1.767	-1.1	-1.782	-1.1
Mov2	1.654	1.5	1.790	1.6
μ_s	**0.077**	**3.1**	**0.072**	**2.8**
Exporters			**0.012**	**2.3**
D_{it}	**0.021**	**5.6**	**0.022**	**5.7**
Average Margin	**0.121**	**5.5**		
Non-exporters			**0.115**	**5.0**
Exporters			**0.130**	**5.6**
Sargan test	11.0 (15)		9.98 (15)	
Industrial dummies F-test (cost)	116.3 (19,5541)		113.8 (19,5541)	
Industrial dummies F-test (margin)	118.4 (13,5547)		118.4 (13,5547)	
Number	3952		3952	
Years	1992-1999		1992-1999	

Notes:
- t-statistics are robust to heterocedasticity.
- Apart from the exogenous variables, the instruments used are the lagged values at *t-2* of the following variables: *y*, y^2 and time and industry dummies for the cost equation and *y*, y^2, *k*, *w*, *wk*, k^2 and time and industry dummies for the margin equation.
- In the Sargan test and industrial dummies F-test, freedom degrees are in parenthesis.

Table 5. Cost Function, Cost Labor Share and Margin Equation (Joint Estimate by GMM): Persistent exporters and entrants

	Persistent exporters				Entrants	
	Multimarket (1)		Unimarket (2)		(3)	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
β_0	0.888	2.0	-0.129	-0.1	0.756	1.3
β_1			1.082	17.0	0.987	11.8
β_1^d	0.533	29.3				
β_1^f	0.523	11.1				
β_2	-0.048	-0.4	0.178	0.9	-0.583	-2.0
β_3	-0.058	-1.2	-0.075	-0.6	-0.014	-0.2
β_4	-0.171	-38.2				
β_5			0.002	0.2	0.061	3.0
β_5^d	0.020	2.5				
β_5^f	-0.005	-0.7				
β_6			0.033	7.9	0.024	2.2
β_6^d	0.014	7.5				
β_6^f	0.016	8.9				
β_7	-0.016	-1.2	-0.015	-0.8	0.037	1.4
β_8			-0.017	-6.2	-0.014	-2.2
β_8^d	0.077	39.6				
β_8^f	0.077	27.3				
β_9	0.071	2.3	0.055	1.0	-0.186	-3.1
β_{10}	-0.013	-4.5	-0.016	-2.3	-0.016	-2.7
β_{11}	-0.022	-5.7	-0.018	-2.2	-0.019	-3.1
Mov1	-0.506	-1.3	-0.942	-0.8	-0.134	-0.2
Mov2	0.302	1.7	0.574	0.6	0.468	1.5
μ_s			**0.074**	**1.6**	**0.123**	**3.7**
μ_s^d	**0.060**	**2.3**				
μ_s^f	**0.045**	**1.5**				
D_{it}			**0.019**	**3.7**	**0.019**	**1.8**
D_{it}^d	**0.024**	**3.8**				
D_{it}^f	**0.028**	**3.9**				
ER			**-0.037**	**-3.8**	**-0.002**	**4.7**
Average margin			**0.103**	**2.4**	**0.153**	**6.8**
Domestic	**0.111**	**5.4**				
Foreign	**0.097**	**3.1**				
Sargan test	37.5 (14)		13.7 (9)		20.0 (14)	
Ind. Dum. F-test (cost):	191.3 (19,2581)		124.4 (19,2581)		190.8 (17,543)	
Ind. Dum. F-test	86.2 (13,2587)		110.8 (13,2587)		81.1 (12,548)	
(margins):	71.9 (13,2587)					
Number of observations	2600		2600		560	
Number of firms	325		325		70	
Years	1992-1999		1992-1999		1992-1999	

Notes to Table 5:

- t-statistics are robust to heterocedasticity. In the Sargan test and industrial dummies F-test, freedom degrees are in parenthesis.
- In Column 1, apart from the exogenous variables, the instruments used are the lagged values at *t-2* of y_d, y_x, y_d^2, y_x^2, $y_d y_x$, $y_d w$, $y_x w$, $y_d k$, $y_x k$. In the second estimate, y and y^2 are used in the cost equation. In the last column y, y^2 and yk (y, y^2) are used in the cost (margin) equation.

Table 6. Cost Function, Cost Labor Share and Margin Equation (Joint Estimate by GMM): Persistent exporters

	Vehicles	**Textile, clothing, leather, fur and footwear**
β_0	0.937 (1.2)	-0.128 (0.3)
β_1	1.211 (14.7)	1.093 (14.1)
β_2	0.319 (0.9)	-0.311 (1.5)
β_3	-0.407 (5.3)	-0.073 (1.5)
β_5	0.014 (0.6)	0.016 (1.1)
β_6	-0.004 (0.1)	0.017 (3.0)
β_7	0.029 (0.5)	0.025 (1.3)
β_8	-0.010 (2.3)	-0.012 (2.8)
β_9	-0.226 (1.2)	-0.069 (1.2)
β_{10}	0.017 (2.7)	-0.007 (2.6)
β_{11}	**-0.039 (6.1)**	**-0.009 (1.9)**
Mov1	0.308 (1.5)	-0.103 (0.4)
Mov2	0.303 (1.8)	
μ	**0.128 (3.0)**	**0.129 (5.2)**
Export ratio	**0.071 (2.6)**	**-0.027 (1.5)**
D_{it}	**0.016 (2.2)**	**0.005 (0.6)**
Average margin	**0.196 (5.4)**	**0.130 (7.3)**
Sargan test	8.33 (8)	3.0 (9)
Number	248	312
Years	1992-1999	1992-1999

Notes to Table 6:
- t-statistics are robust to heterocedasticity. In the Sargan test and industrial dummies F-test, freedom degrees are in parenthesis.
- Apart from the exogenous variables, the instruments used are the lagged values at *t-2* of *y*, y^2, *yw*, *yk* in the cost equation and *y*, y^2 in the margin margin equation.

Figure 1: Price-Cost margins (Sample averages)

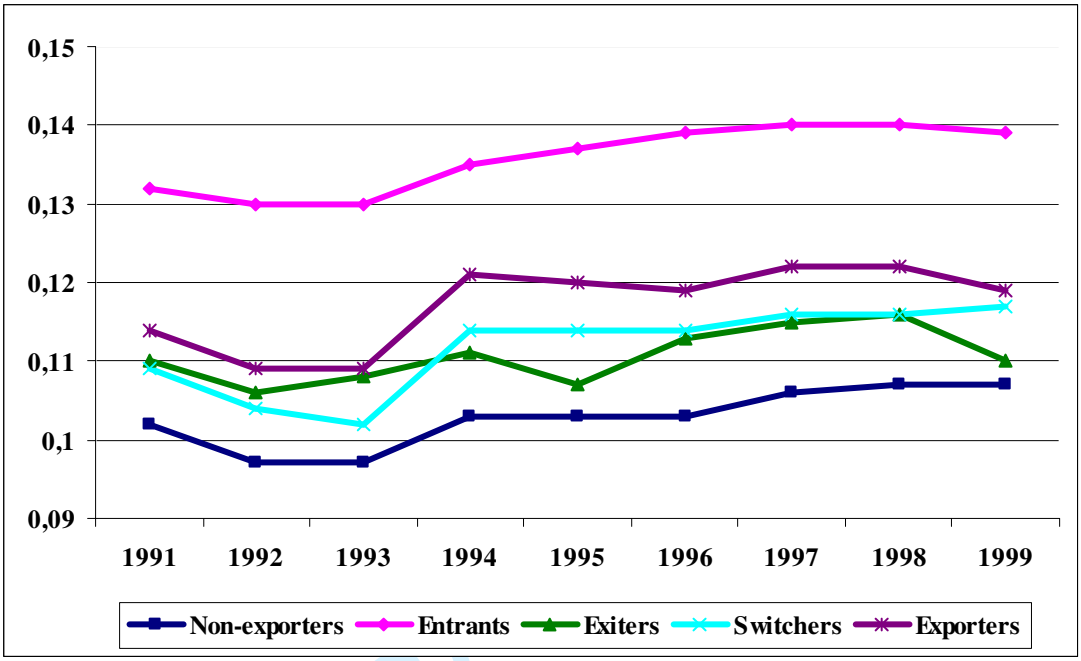

Figure 2: Distribution of margins